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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/621,553

07/21/2000

Tatsuki Okamoto

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06/17/2004

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EXAMINER

HESELTIME, RYAN J

ART UNIT

PAPER NUMBER

2623

DATE MAILED: 06/17/2004

14

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/621,553

Applicant(s)

OKAMOTO ET AL.

Examiner

Ryan J Hesseltine

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5,9-24 and 26-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,5,9-24 and 26-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 2, 2004 has been entered.

Response to Arguments

2. Applicant's arguments on page 7, last paragraph to page 8, first paragraph, filed April 2, 2004, with respect to claims 21 and 23 have been fully considered and are persuasive. The objections to claims 21 and 23 have been withdrawn.
3. Applicant's arguments with respect to claims 1 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

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5. Claims 1 and 9 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 2 of U.S. Patent No. 6,414,749 to Okamoto et al. Although the conflicting claims are not identical, they are not patentably distinct from each other because claims 1 and 9 of the instant application are a broader version of claims 1, 2, and 6 of the aforementioned patent.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 1, 9, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield et al. (USPN 3,716,301, previously cited), hereafter Caulfield, in view of Shinzaki et al. (USPN 6,127,674, newly cited), hereafter Shinzaki.

8. Regarding claim 1, Caulfield discloses an irregular pattern (fingerprint) reader comprising: a prism (Figure 6, element 38) including a detection surface (top) on which a subject (finger) to be detected, having an irregular pattern, is put, a planar incident surface (left side) having a first angle of inclination relative to said detection surface, and a planar emission surface (right side) having a second angle of inclination relative to said detection surface (top side), said prism emitting emission light (right side) reflected from said detection surface at said planar emission surface and corresponding to incident light incident upon said incident surface (column 8, line 32-58), the emission light being substantially parallel to said detection surface (column 8, line 62-column 9, line 27); a first optical system (35-37) including a light source (35), light from

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the light source being incident on said incident surface of said prism, the light having an optical axis substantially parallel to said detection surface where the light is incident on said incident surface (Figure 6); and a second optical system (39-43) for transmitting the emission light emitted from said prism to an image pick-up device (42, 43; column 9, line 11-27).

9. Caulfield discloses an image pick-up device (42, 43), wherein said second optical system includes lenses (39), but does not explicitly disclose that the lenses are of different magnifications in vertical and horizontal directions. Shinzaki discloses an uneven-surface data detection apparatus including a lens system composed of lenses 14 and 15 for converging emission light in the Y-direction (vertically) and X-direction (horizontally), respectively, to form an image on an image pick-up surface of the image pick-up device 16 (Figure 6; column 5, line 39-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize lenses of different magnifications in vertical and horizontal directions in said second optical system as taught by Shinzaki in order to sufficiently compensate for magnification of X and Y directions so the image is not distorted (column 2, line 3-16).

10. Regarding claim 9, Caulfield discloses an irregular pattern reader wherein said prism includes luminous flux converging means (lens 39) for converging the emission light on the image pick-up device (42, 43, Figure 6; column 8, line 32-40).

11. Regarding claim 12, neither Caulfield nor Shinzaki explicitly disclose that the first angle (between the incident surface and the detection surface) is less than 45 degrees and more than an angle obtained by subtracting an angle of reflection at said detection surface from 90 degrees. It is clear that this limitation depends on the critical angle of the incident light on the prism and would be satisfied depending on the shape of the prism, which could be changed, based on the

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specifications of the device. It would have been obvious to one having ordinary skill in the art at the time the invention was made to specify the angular relationships of the prism faces in order to make the system thinner by decreasing the angles of both the incident plane and the emission plane with respect to the detection surface.

12. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Shinzaki as applied to claim 1 above, and further in view of Kato et al. (USPN 4,924,085, newly cited), hereafter Kato.

13. Regarding claim 11, Caulfield does not disclose that the light reflected from said detection surface is reflected from said incident surface, and emitted as the emission light through said emission surface. Kato discloses an uneven-surface data detection apparatus including a transparent or light transmission base 7 having a lower (incident) surface 7-1 and an upper (detection) surface 7-2, which are substantially parallel to each other (Figure 1; column 4, line 29-36). Kato further discloses that scattered light beams (from the upper detection surface) that satisfy the total reflection condition of the base 7 are totally reflected by the lower surface 7-1, totally reflected by the upper surface 7-2, and reflected again by the lower surface 7-1 and finally passing through a focusing lens 11 at the planar emission surface. The examiner realizes that the planar incident surface in this case is parallel to the detection surface, but the examiner would like to point out that neither claim 1 nor claim 11 specify the "first angle of inclination relative to said detection surface" with respect to the planar incident surface. Additionally, note that Kato discloses that the upper and lower (first and second, respectively) surfaces are not always parallel to each other, but light must be totally reflected by the second, opposite surface at

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least once (column 3, line 34-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to reflect the light from the detection surface again from the incident surface and emitted as the emission light through said emission surface as taught by Kato in order to prevent scattered light from recessed portions 6b (valleys) of the fingerprint from being transmitted through the interior of the base 7 such that only totally reflected light is detected by the image sensor 12 to obtain an uneven surface pattern image (column 5, line 1-6).

14. Claims 10, 17, 24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Kato.

15. Regarding claim 10, Caulfield discloses an irregular pattern (fingerprint) reader comprising: a prism (Figure 6, element 38) including a detection surface (top) on which a subject (finger) to be detected, having an irregular pattern, is put, a planar incident surface (left side) having a first angle of inclination relative to said detection surface, said prism emitting emission light (right side) reflected from said detection surface and corresponding to incident light incident upon said incident surface (column 8, line 32-58), the emission light being substantially parallel to said detection surface (column 8, line 62-column 9, line 27); a first optical system (35-37) including a light source (35), light from the light source being incident on said incident surface of said prism, the light having an optical axis substantially parallel to said detection surface where the light is incident on said incident surface (Figure 6); and a second optical system (39-43) for transmitting the emission light emitted from said prism to an image pick-up device (42, 43; column 9, line 11-27).

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16. Caulfield does not disclose that the emission light is emitted from said prism in a direction opposite to the incident light or a reflection surface for reflecting the light reflected from said detection surface. Kato discloses an uneven-surface data detection apparatus including a transparent body 7 that is bent twice by 90 degrees into a substantially J-shaped configuration (Figure 12; column 8, line 28-37). This embodiment does not show where the incident light impinges on the transparent body 7, but it is clear that the emission light is emitted substantially parallel to the detection surface 7-2 and in the opposite direction due to reflection surfaces 7-3, 7-4, 7-5, 15, etc. (Figure 12, column 8, line 43-54). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include reflection surfaces such that the emission light is emitted from said prism in a direction opposite to the incident light as taught by Kato in order to provide an uneven surface data detection apparatus having a relatively thin thickness so the apparatus can be easily incorporated into a door, a keyboard of a computer terminal, etc. (column 2, line 20-25).

17. Regarding claim 27, Kato discloses that said prism 7 includes a lens portion (11, Figure 1; 14, Figure 11) receiving light reflected from said reflection surface (7-1, 15) and directing the light to said second optical system (column 4, line 49-58), and an image pick-up surface 12 of said image pick-up device is substantially parallel to said detection surface 7-2 (Figure 11; column 8, line 7-27). The examiner realizes that several different embodiments are shown in Kato, but it is believed that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine features from all embodiments to arrive at applicant's invention.

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18. Regarding claim 24, Kato discloses that said prism includes two reflection surfaces (7-1, 7-2) and the light reflected from said detection surface 7-2 is reflected a second time from said incident surface 7-1 (at P1) and, sequentially, from each of said two reflection surfaces (at P2 and P3) and is emitted through said lens portion 11 (Figure 1; column 4, line 49-58).

19. Regarding claim 17, neither Caulfield nor Kato explicitly disclose that said second optical system is located on the image pick-up surface of said image pick-up device. The examiner takes Official Notice that locating a lens and/or a light turning means in close proximity to an image pick-up device is well known in the art, and integrating the systems on the same plane would serve only to make the device more compact. It would have been obvious to one of ordinary skill in the art at the time the invention was made to locate the second optical system on said image pick-up plane in order to make the device thinner and more compact and integrated.

20. Claims 5 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Kato as applied to claim 10 above, and further in view of Teng et al. (USPN 6,381,347, newly cited), hereafter Teng.

21. Regarding claim 5, Kato discloses that said reflection surface (7-3, 7-4, 7-5, 15) has a second angle of inclination relative to said detection surface (Figure 12; column 8, line 28-37), but does not disclose that light from said detection surface diverted at said reflection surface is emitted from said prism through said incident surface as the emission light. Teng discloses a high contrast, low distortion optical acquisition system for imaging capturing including a prism 310 having a rectangular imaging (detection) surface 318, a rectangular viewing (emission)

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surface 320, which also serves as a light receiving (incident) surface from light source 312, and a light scattering (reflection) surface 322 (Figure 4; column 8, line 10-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to emit light from said prism through said incident surface as the emission light as taught by Teng in order to provide a compact image acquisition apparatus that produces a high contrast, low distortion image and is relatively inexpensive to manufacture (column 5, line 36-58).

22. Regarding claim 26, Kato discloses that said prism includes a reflection member (mirror) on said reflection surface 7-3 (column 8, line 28-37).

23. Claims 13, 14, and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Kato as applied to claim 27 above, and further in view of Hebert (USPN 5,596,454, previously cited).

24. Regarding claim 13, neither Caulfield nor Kato disclose that a region through which a luminous flux in said prism does not pass is omitted from said prism at a surface facing said detection surface. Hebert discloses an uneven surface image transfer apparatus wherein an optical plate 64 is used as an imaging prism with many reflective surfaces of different angles. The device is designed to be as compact and light as possible and the optical plate is shaped such that it better fits into the device and room is made for other components (column 9, line 15-40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to omit a region through which luminous flux in said prism does not pass from a plan of said prism facing said detection surface as taught by Hebert in order to lessen the weight of the device

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or make the device more compact by making room for other components, e.g. the imaging device or the light source (figure 7 and 13).

25. Regarding claim 14, none of the cited references disclose the claimed dimensions of the detection surface having 20 mm in width, 15 mm in length, and said prism having a thickness of not more than 10 mm. The examiner takes Official Notice that it is well known that the prism dimensions can be adjusted to the desired length, width, and thickness depending on the desired amount of fingerprint (irregular pattern) information and the intended application. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a prism having the claimed dimensions in order to satisfy a design requirement, or to obtain a thickness as small as possible for use in a portable device as is evident in Metz, which strives to fit the device into a PCMCIA card for use in a portable computer or cellular telephone (column 10, line 57-65).

26. Regarding claim 19, Hebert discloses that a region through which a luminous flux in said prism does not pass is omitted from said prism at a surface facing said detection surface (see above discussion of claim 13), said second optical system and said image pick-up device are respectively located on an electronic substrate (printed circuit board 66', Figure 13; column 10, line 35-50). Each of the elements mounted on said electronic substrate having a thickness of no more than 10 mm and a length of no more than 35 mm, and said detection surface of said prism approximately 20 mm in width and approximately 15 mm in length are all design choices. It would have been obvious to one of ordinary skill in the art at the time the invention was made to omit unused regions from said prism and locate the devices on an electronic substrate having the

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claimed dimensions as taught by Hebert in order to make the system lighter and to integrate the system into one compact device (column 9, line 14-26).

27. Regarding claim 20, Hebert discloses that said image pick-up device is mounted as a bare chip (Figure 13, element 204) on one of said electronic substrate and said second optical system (column 10, line 46-61).

28. Regarding claim 21, Caulfield does not disclose that said prism includes a concave reflecting surface reflecting to said emission surface light reflected from said detection surface. Hebert discloses a prism (platen 130) having first and second toroidal surfaces (136, 140), which reflect light from said detection surface 86 to said emission surface 138 (Figures 5, 6, 11; column 7, line 25-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a prism having a concave reflecting surface as taught by Hebert in order to reduce or eliminate geometric distortion and astigmatism at the plane of the imaging device (column 7, line 28-39).

29. Regarding claim 22, Kato discloses that said lens portion (11, 13) is a cylindrical surface (integrally formed or adhered, Figures 2, 10; column 5, line 17-28; column 7, line 53-58).

30. Regarding claim 23, Hebert discloses toroidal reflecting surfaces in combination with an aspheric imaging lens 142 (column 7, line 14-17), but does not disclose that said lens portion includes a toric lens is mounted on said prism. It would have been obvious to one of ordinary skill in the art at the time the invention was made to mount a toric lens on the prism in order to reduce or eliminate any geometric distortion or astigmatism in the image that is transferred to the image sensing device (column 7, line 17-24).

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31. Claims 15, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Kato as applied to claim 17 above, and further in view of Matsumura.

32. Regarding claim 15, Kato discloses that said image sensor 12, such as a CCD, may be mounted on a printed circuit substrate 31 and a collimator lens having a cylindrical portion 13 and a convex lens portion 14 integrally formed or adhered to said prism 7 (Figure 10; column 7, line 53-68), but does not disclose that said light source is located on an electronic substrate or that said first optical system includes a collimator lens and incident light turning means located between said light source and said collimator lens. Matsumura discloses a first optical system including a light source (Figure 13, element 103) located on an electronic substrate (inherent) and a collimator lens (diffuser 102) and an emission light turning means (mirror 104) wherein emission light is incident upon said image pick-up plane (106) from said prism (101) through said emission light turning means (104) and another collimator lens (105; column 12, line 58-67). While Matsumura does not disclose that the light turning means is situated between the light source and the collimator lens, this is an obvious variation in view of the emission light turning means 104. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include locate said light source on an electronic substrate and provide a first optical system having an incident light turning means located between a light source and a collimator lens as taught by Matsumura in order to make the input part more compact by bending the optical axis with a mirror to provide for an increased optical path (column 12, line 61-63).

33. Regarding claim 16, Matsumura does not explicitly disclose that said light-turning means includes a transparent block and that an emission surface of said light turning means includes a collimator lens. The examiner takes Official Notice that it is well known in the art to use a prism

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as a light turning means and that a prism and a lens can be integrally formed (Kato, Figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a transparent block as said light-turning means including a collimator lens in order to reduce the number of parts in the system and make them less susceptible to breakage or displacement.

34. Regarding claim 18, Matsumura does not explicitly disclose that said light turning means is not more than 10 mm in thickness, but it is a common goal to obtain a thickness as small as possible in a portable device as is evident in Metz, which strives to fit the device into a PCMCIA card for use in a portable computer or cellular telephone (column 10, line 57-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide said incident light turning means not more than 10 mm in thickness in order to reduce the size and weight of the device.

35. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Caulfield in view of Kato as applied to claim 27 above, and further in view of Shinzaki in view of Hakenewerth et al. (USPN 4,684,802, newly cited), hereafter Hakenewerth.

36. Regarding claim 28, Kato discloses that said lens portion includes a cylindrical lens for converging the light reflected from said reflection surface (column 5, line 36-41; column 7, line 53-58), but does not disclose that said reflection surface has a cylindrical reflection surface for converging in a horizontal direction the light reflected from said detection surface or that said cylindrical lens converges light in a vertical direction, transverse to the horizontal direction. Hakenewerth discloses an elliptical finger press scanner with a rotating light source including a

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cylindrical reflection surface 32 for converging the light reflected from said detection surface 40 (Figure 1; column 2, line 18-47), and a lens portion including a cylindrical lens 70 for converging light reflected from said cylindrical reflection surface 32 (column 2, line 48-56). It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a cylindrical reflection surface for converging light reflected from said detection surface and a cylindrical lens for converging light reflected from said cylindrical reflection surface as taught by Hackenewerth in order to provide an increased image area using a cylindrical elliptical surface while avoiding divergence and refraction (column 1, line 30-48). Shinzaki discloses a lens system composed of cylindrical lenses 14 and 15 for converging emission light in the Y-direction (vertically) and X-direction (horizontally), respectively, to form an image on an image pick-up surface of the image pick-up device 16 (Figure 6; column 5, line 39-53; see above discussion of claim 1).

Conclusion

37. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPN 3,975,711 to McMahon discloses a real time fingerprint recording terminal wherein the incident light and emission light enter and leave a prism from the same surface. USPN 4,728,186 to Eguchi et al. discloses an uneven-surface data detection apparatus including orthogonal cylindrical lenses. USPN 5,629,764 to Bahuguna et al. discloses a prism fingerprint sensor using a holographic optical element wherein the emission light is parallel to the detection surface. USPN 6,185,319 to Fujiwara discloses a fingerprint input apparatus wherein an optical fingerprint collection surface is substantially parallel to the imaging plane and light is emitted from the prism through the incident surface.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J Hesseltine whose telephone number is 703-306-4069.

The examiner can normally be reached on Monday - Friday, 8:30 AM - 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ryan J. Hesseltine
June 2, 2004


JINGGEWU
PRIMARY EXAMINER